ANALYSIS OF THE RELATIONSHIP BETWEEN THE LENGTH OF EYE VISIT AND THE PARAMETERS OF ADVERTISEMENTS VISIBLE FROM THE ROAD

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Research project:
Impact of Advertisements on road safety level

Orderer: Joint initiative of National Centre of Research and Development, General Director for National Roads and Motorways – research project Rozwój Innowacji Drogowych, project RID 3D (agreement no DZP/RID-I-33/4/NCBR/2016)

Performer: Motor Transport Institute in Consortium with: Warsaw University of Technology, University of Warsaw and Gdansk University of Technology

Project team leader: prof. Adam Tarnowski
Eye tracking research

• Pilot research—5 drivers,
• Main research—60 drivers,
• Track ca 100 km,
• Almost 3 000 advertisements.
Probe – drivers – age, experience

<table>
<thead>
<tr>
<th>Group I (20 person)</th>
<th>Group II (20 person)</th>
<th>Group III (20 person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: up to 25</td>
<td>Age: 30-40</td>
<td>Age: 55-65</td>
</tr>
<tr>
<td>Driver licence cat. B less than 3 years</td>
<td>Driver licence cat. B more than 3 years</td>
<td>Driver licence cat. B more than 3 years</td>
</tr>
<tr>
<td>Active driver – more than 3 000 km per year</td>
<td>Active driver – more than 3 000 km per year</td>
<td>Active driver – more than 3 000 km per year</td>
</tr>
</tbody>
</table>
Probe – drivers - characteristics

2 person – failed calibration
3 person – „gaze sampling” – ca 30 – 40 % (contact lenses)
55 person – tested

11 – night drives
44 – day drives

17 person – Group I (age 25)
19 person – Group II (age 30 - 40)
19 person – Group II (age 55 - 65)

15 person – women
40 person – men
## Research track - characteristics

<table>
<thead>
<tr>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 km</td>
<td>- length</td>
</tr>
<tr>
<td>1x2, 2x2, 2x3</td>
<td>- city (Gdańsk)</td>
</tr>
<tr>
<td>2x2</td>
<td>- urban, DK 91 (Tczew)</td>
</tr>
<tr>
<td>1x2</td>
<td>- rural, DK 91</td>
</tr>
<tr>
<td>1x2</td>
<td>- passage though town, DK 91</td>
</tr>
<tr>
<td>1x2</td>
<td>- rural, DW 224</td>
</tr>
<tr>
<td>1x2</td>
<td>- passage though town, DW 224</td>
</tr>
<tr>
<td>2x2</td>
<td>- A1</td>
</tr>
<tr>
<td>2x2, 2x3</td>
<td>- S6 (3City by-pass)</td>
</tr>
</tbody>
</table>
Research track – advertisements

2825 – no. of advertisements (seen in one direction)
972  – catalogued advertisements

80 %  – build-up area
20 %  – not build-up area

45 %  – left side of road
55 %  – right side of road

1 %   – LED
1 %   – mobile (trailer)
6 %   – flag
6 %   – pylon
17 %  – free standing
32 %  – baner
37 %  – sign board
Research statistics

96,75 h – total research time
1,16 (70 min) – total advertisement gaze during research
1,2 % – advertisement gaze time/total research time
4058 – eye visit on advertisements
854 – advertisements with minimum 1 eye visit
29 % – advertisement gazed on more than 1 driver
323 (38%) – advertisement spotted by more than 5 drivers
44 (5 %) – advertisement spotted by more than 15 drivers
Average no. of eye visits on advertisement/ age

Below 25: 55
30-40: 83
55-65: 81
Average eye visit time on advertisement/age

<table>
<thead>
<tr>
<th>Age group</th>
<th>Visit time [s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 25</td>
<td>1.00</td>
</tr>
<tr>
<td>30-40</td>
<td>1.07</td>
</tr>
<tr>
<td>55-65</td>
<td>1.02</td>
</tr>
</tbody>
</table>
Average no, average eye visit time on advertisement/sex

![Graph showing the average number of visits and visit time for women and men.](image)
Average number, average eye visit time on advertisement/day - night

<table>
<thead>
<tr>
<th></th>
<th>Number of eye visits</th>
<th>Visit time [s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>80</td>
<td>1,01</td>
</tr>
<tr>
<td>Night</td>
<td>47</td>
<td>1,18</td>
</tr>
</tbody>
</table>

The graph shows the average number of eye visits and the time spent visiting advertisements for day and night.
Eye visit on advertisements/age

$R^2 = 0.1132$
Eye visit on advertisements/age
Average eye visit time on advertisement/age
Average eye visit time on advertisement/age
Max eye visit time on advertisement/age

Time [s] vs. Age
Average eye visit time/ advertisements gazed on

\[ R^2 = 0.2565 \]
Average eye visit time/ advertisements watched

![Graph showing the relationship between maximum time spent and number of advertisements gazed on with an R² value of 0.4282.]

$R^2 = 0.4282$
Time distribution of total eye visit on advertisements

- $K_{50} = 0.5\ s$
- $K_{82} = 1.6\ s$
- $K_{85} = 1.9\ s$
- $K_{90} = 2.8\ s$
Average eye visit time / advertisement size

R² = 0.865
Conclusions

• On average every 33 m an advertisement is located
• By night drivers gaze on advertisements 37% less often, however eye visit time is 15% longer
• Relation between size of advertisement and eye visit time was concluded
• 15 % eye visit lasted more than 1,9 s and 10 % longer than 2,8 s
• „Record-holder” gazed on 260 advertisements (9 %)!
• Number of eye visits and their average time indicate that drivers pay a lot of attention to other activities than driving
• Study is continued in search of other relations (angle, type, illumination)
Thank You for Your attention

Presentation shows conclusions of the research project: „Impact of Advertisements on road safety level” realised by consortium: ITS, PW, UW, PG joint initiative of NCBiR and GDDKiA (agreement no DZP/RID-I-33/4/NCBR/2016).